

## Pavlov in Spain

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Reflexology has been present throughout Spanish science since the last third of the nineteenth century and its importance can be seen in the works of authors such as Martín Salazar, Ramón y Cajal, Gómez Ocaña, Simarro and Turró. The most important research in Reflexology in Spain takes place a) at the Schools of Neurophysiology and Psychology in Barcelona and Madrid, b) with a group of authors specializing in pathological medicine and c) in the Military's Health Department. Pavlov's work was received in Spain with special interest. Fernández-España, who could be considered the "first Spanish Pavlovian," emphasized Pavlov's work in a series dedicated to the study of objective psychology which was published between 1914 and 1924. Planelles was the first investigator to develop a program in Pavlovian experimentation, presenting his results in 1935. The Civil War (1936-1939) ended these and many other Spanish projects in psychology. After the war, interest in Reflexology and Pavlov's theories slowly rose again, first through psychosomatic medicine and then in the 60's because of the works of such authors as Monserrat-Esteve, Rof Carballo and Colodrón. The progressive inclusion of psychology in the Schools of Philosophy and Arts after 1968 marked the beginning of a new era.

*Keywords: reflexology, Pavlov, Spanish psychology*

La reflexología está presente en la ciencia española desde el último tercio del siglo XIX y su importancia es visible en la obra de autores como Martín Salazar, Ramón y Cajal, Gómez Ocaña, Simarro o Turró. Las principales vías de penetración del pensamiento reflexológico en España son: a) las escuelas de neurofisiología y psicología de Barcelona y Madrid; b) un grupo de autores especialistas en patología médica y c) el Cuerpo de Sanidad Militar. La obra de Pavlov es acogida con especial interés. Fernández-España, que puede ser considerado el "primer pavloviano" español, lo sitúa como figura central en una serie de trabajos dedicados al estudio de la psicología objetiva, publicados entre 1914 y 1924. Planelles, por su parte, es el primer investigador que desarrolla un programa de experimentación pavloviana, presentando sus conclusiones en 1935. La Guerra Civil (1936-1939) trunca éste y otros muchos proyectos de la psicología española. Tras la guerra, lentamente volverá a recuperarse el interés por la reflexología y el pensamiento de Pavlov, primero a través de la medicina psicosomática y posteriormente en la década de los 60 por medio del trabajo de autores como Monserrat-Esteve, Rof Carballo y Colodrón. La progresiva inclusión de la psicología en las Facultades de Filosofía y Letras a partir de 1968 marca el inicio de una nueva etapa.

*Palabras clave: reflexología, Pavlov, psicología española*

Scientific reflexology has been present in Spanish psychology at least since the beginning of the last quarter of the 19<sup>th</sup> century. It appeared at the time of the Restoration era, which started in January of 1875 with the conclusion of the First Republic and the arrival of the new King Alfonso XII. During this era the consolidation of positivist mentality, the diffusion of the ecological paradigm, the acceptance –not without controversy– of evolutionism, and, consequently, the secularization of thought in accordance with modern times also took place.

In *Teorías Modernas sobre la Fisiología del Sistema Nervioso* [*Modern Theories of the Physiology of the Nervous System*] (1878), Simarro, who in 1902 was the first in Spain to obtain an Experimental Psychology Chair at the Faculty of Sciences of the University of Madrid, declared that “any action of the nervous system can be considered a sum of simple reflex acts” (p. 205). That same year, in an article published in the *Gaceta de Sanidad Militar* [*Military Health Gazette*], Auber (1878) mentioned Sechenov’s investigations with special reference to his work “Pneumatologie des Blutes” [“Pneumatology of the Blood”], which had appeared in 1859 in the *Zeitschrift für Rationelle Medizin* [*Newspaper for Rational Medicine*]. In 1880, Martín Salazar published an article entitled “La Acción Refleja” [“The Reflex Action”], in the same *Gaceta de Sanidad Militar*, in which he commented enthusiastically on the work of Laycock, Carpenter, and Luys, and in which such expressive paragraphs appear: “Although the fundamental differences between organic and inorganic matter are torn into a thousand pieces by modern biological studies, there still remained ... another stronger barrier ... that separated psychology and physiology, and isolated the moral world from the material world. But ever since the cerebral reflex action was demonstrated ... and the moral phenomenon has fit in the material principle ... from this very moment, the secular wall has fallen down ...” (p. 354).

This line of reflexological thought, fully in tune with the European science of its time, was still in force in the Course of Psychology that Simarro gave at the Ateneo of Madrid between 1896 and 1897, and in his work *Enfermedades del Sistema Nervioso* [*Illnesses of the Nervous System*], published in 1898, in which he defined mental life in terms of chains of conscious reflex actions. His theory of *iteration* (Simarro, 1902), that is, the physiological process of the production of associations that make up the base of adaptation to the environment, “interpreted within an evolutionist framework, is systematically and generally prior to –although not precisely or experimentally confirmed– the concepts of the *conditioned reflex* that Pavlov described in Madrid in 1903, and of *reinforcement*, which, after Thorndike’s initial contribution in 1889, will be progressively enriched by behaviorism and neo-behaviorism, from Watson’s time to the present” (Yela, 1987, p. 72).

Simarro also seems to have studied Pavlov’s *The Work of the Digestive Gland*, to judge by the bookmarks found

in his copy of the 1901 French translation of this book. The French translation carried out in 1907 of Bechterev’s *Psychological Activity of Life* can also be found among the volumes of his extensive library.

### Echoes of the Madrid Lecture

On April 28, 1903, Pavlov participated as a visiting lecturer in the XIV International Congress of Medicine held in Madrid, expounding on “psychological reflexes” for the first time, in the amphitheater of the School of Medicine. “Experimental Psychology and Psychopathology in Animals” was only a preliminary report, and even Pavlov took a few years to make his point of view clear about the phenomenon: not until 1906 did he publish, in English, the article about the “so-called psychological processes” in *The Lancet*, and not until 1927 did *Conditioned Reflexes* appear in English –translated by Anrep–, based on lectures given in Leningrad in 1924. Despite the fame bestowed upon him by the Nobel Prize, Pavlov and his laboratory’s ideas and research that were advanced at the Madrid Lecture were not systematically expounded and were therefore not readily available in Europe until well into the 1920s. Pavlov did not meet the edition-coordinators’ deadline when sending in his lecture text and, therefore, it could not be included in the Congress Proceedings. First published in Russian, his text only appeared in more accessible language for the research community in 1928, when it was included in *Lectures on Conditioned Reflexes*, in a translation by Gantt.

On the other hand, in Russia, in 1904, Bechterev published an article entitled “Objective Psychology,” which appeared translated into French in the *Revue Scientifique*, in September of 1906. In 1910, he published a book of the same title, translated and edited in Paris in 1913. In Madrid, in 1917, the worthy editor Jorro, published *Las funciones de los Centros Nerviosos* [*The Functions of the Nervous Centers*] in the series *Enciclopedia Científica* [*Scientific Encyclopedia*]. It was translated by Hoyos Sainz, professor of Physiology and School Hygiene in the School of Higher Teaching Studies in Madrid. In this book, Bechterev quoted our Spanish Nobel Prize of Medicine winner, Ramón y Cajal, and Gómez Ocaña. The latter, professor of physiology in Madrid since 1894 and a frequent participant in International Congresses of Physiology and Medicine, kept up a direct relationship with Pavlov after their meeting in Madrid, at the aforementioned International Congress of Medicine. Ramón y Cajal (1905), in his “Prologue” to the *Introducción al estudio de la psicología positiva* [*Introduction to the Study of Positivist Psychology*], by Maestre, professor of Legal Medicine at the University of Madrid, proposed the constitution of an objective psychology or psychological histology to account for the phenomena of consciousness in terms of cellular phenomena governed chiefly by mental association mechanisms.

Turró (1908), who became the Director of the Municipal Laboratory of Barcelona and who is considered to be the father of Catalanian Experimental Psychology, based his analysis of the psychophysiological mechanism of elemental balance on the histological and neurophysiological research of Golgi, Cajal, and Pavlov in Section III of his work "Psychologie de L' Equilibre du Corps Humain" ["Psychology of the Balance of the Human Body"]. In Section V, in reference to the origin of voluntary movements, he mentioned Pavlovian research on secretion reflexes. In the chapter "La Experiencia Trófica" ["The Trophic Experience"] of his book *Orígens del Coneixement: la Fam* [*Origens of Knowledge: Hunger*], edited in Barcelona by the Societat Catalana d'Edicions, Turró (1912) referred to some of Pavlov's experiments and theses on the conditioning of digestive functions, commenting on the experiences of some of Pavlov's disciples, such as Krasnogorski or Boldireff. The 1916 Spanish edition, published after the French and German editions, included a "Prologue" by Unamuno.

Santamaría (1912), one of Simarro's disciples who read psychology, and who was a professor of Psychology, Logic, and Ethics at the Institute of Soria in 1910, repeatedly quoted Pavlov's work about the psychological excitation of the salivary glands in his study in *Los Sentidos* [*The Senses*], lessons about psychometrics he taught in the School of Criminology of Madrid.

In 1917, La Vaissière's *Experimental Psychology* was published in Barcelona by Subirana, pontifical editor and bookseller, and translated by Palmés, professor of Psychology at the Colegio Máximo that was run by the Jesuits in Sarriá. Pavlov's experiments are described in detail in this edition, with reproductions of some illustrations from "Méthodes de la Psychologie Animale" ["Methods of Animal Psychology"] by Claparède. Bechterev was not forgotten: Some of his specific experiments are commented upon, as well as some methodological aspects of his article "Méthode de la Psychologie Objective" ["Method of Objective Psychology"].

Pi Sunyer, an outstanding disciple of Turró, was the first President of the Biology Society of Barcelona (1912), Professor of Physiology at the School of Medicine (1916), and Director of the Physiology Institute of Barcelona (1920), supported a vision of Psychology akin to Physiology in *Los Mecanismos de Correlación Fisiológica, Adaptación Interna y Unificación de Funciones* [*The Mechanisms of the Physiological Correlation, Internal Adaptation, and Merging of Functions*] (1920). Following authors such as Bechterev and Pavlov, he perceived the basic mechanisms of psychological life in association and reflexes. On the other hand, Pi Sunyer's disciple, Mira (1921), who in 1933 secured the first Chair in Psychiatry at the Spanish University in Barcelona, and who was the main figure of the Psychological School of Barcelona, considered Bechterev's objectivist project to be one of the referents of professor Watson's emerging behaviorism. Mira produced an extensive work on Watson in the exposure-commentary section of the new

*Archivos de Neurobiología, Psicología, Fisiología, Histología, Neurología y Psiquiatría* [*Archives of Neurobiology, Psychology, Physiology, Histology, Neurology, and Psychiatry*], the journal founded by Simarro, Ortega y Gasset, Rodríguez Lafora, and Sacristán, which had considerable influence on the consolidation of scientific psychology in Spain.

In 1921 Luna, disciple of Gómez Ocaña and Ramón y Cajal, published an article in the aforementioned journal, *Archivos de Neurobiología* [*Archives of Neurobiology*], in which he presented the results of his experimental research with mice, one of the first to be carried out in Spain in the field of Psychology of Animal Learning. In the first part of his work, Luna expressed open support of the objectivist movement. Regarding experimental procedures, after praising Pavlov's method of *psychological secretions*, he justified his preference for mazes and problem-boxes. In the discussion of the results, some interesting psychobiological considerations were noted (Bandrés & Llavona, 1997a).

Novoa Santos (1922), trained in Germany, Austria, and France with a postgraduate scholarship from the Junta de Ampliación de Estudios [Junta of Extending Studies], and professor of Pathology at the School of Medicine of Santiago de Compostela (1912) and Madrid (1929) Universities, understood the human subject as an organism with the capacity to adapt to the environment by means of learning. The chief mechanism would be the reflex, conceived more with the ideas of Bechterev and Sechenov than those of Pavlov. In this area of his thought, one can observe the influences of Turró and Pi Sunyer. In an attempt to understand the psychological world globally, he joined these objectivist ideas with others taken from James' functionalism, Krestchmer's constitutionalism, and Freud's psychoanalysis.

In 1929, Marañón, endocrinologist as well as medical doctor at the General Hospital of Madrid, Director of the Institute of Medical Pathology, and writer of history, referred to Pavlov in the chapter "La Homosexualidad como Estado Intersexual" ["Homosexuality as an Inter-Sexual State"] in his work *Los estados intersexuales en la especie humana* [*The Inter-Sexual States in the Human Species*]. Therein, he commented that "while still a student, I translated Pavlov's book on the salivary glands into Spanish (which was not published in the end because the editorial that would have printed it went out of business). Ever since, I have been extremely interested in the works of the great Russian physiologist from the viewpoint of their possible applications to the knowledge of human sexuality" (p. 139).

This same year, in Madrid, editor Morata published Pavlov's book *Los Reflejos Condicionados. Lecciones sobre la Función de los Grandes Hemisferios* [*Conditioned Reflexes. Lessons on the Function of the Large Hemispheres*], a translation of the 2<sup>nd</sup> Russian edition –the author of which was not provided– with a "Prologue" by Marañón (1929b). In this prologue, the figure of Pavlov was presented, along with his suggestions for psychiatry and sexual psychopathology,

for the Spanish medical class as an example of the attitude that a man of science should adopt. Marañón extended the scope of his reflections, thinking that in a country where people believe that there are too many theorists and where people insist on creating technicians, it is absolutely necessary to read research texts in which the general problems of biology are treated theoretically, or in which are described the mental and technical stages of the discovery of truth. Reading works such as those by Pavlov, which are now being translated, concluded Marañón, is what provides the foundation, the mentality, and the spirit that scientific research and the country need.

In *La Psicología Contemporánea* [*Contemporary Psychology*] (1930), published by the Editorial Labor in their collection *Biblioteca de Iniciación Cultural: Sección Ciencias Filosóficas* [*Library of Cultural Initiation: Philosophical Sciences Section*], Viqueira, disciple of Simarro and Professor of Psychology, Logic, and Ethics at the Institute of La Coruña (1917), grouped the different concepts of psychology into what he called “general directions” and within each one, he indicated the main “directive lines.” Thus, after an introductory chapter, he devoted two chapters (II and III) to Wundt as the founder of the new independent science, which was relatively separate from philosophy, and one chapter to introspective psychology and its philosophical projection (IV). He also devoted one chapter to James (V), one to Bergson (VI), and one to objectivist psychology (VII), respectively. After a series of historical indications, Viqueira pointed out that the chief position of objectivism was occupied by *behaviorism* founded by Watson, and that its immediate predecessor –behaviorism was no more than the development of this point of view– was Bechterev’s *objective psychology* or *reflexology*, and that Pieron’s concepts pointed in a similar direction. In the bibliography of Chapter VII, he mentioned the German translation of Bechterev’s work, *Objective Psychologie* [*Objective Psychology*] (1913).

However, at the same time, one author chose, as the subject of a long series of works, the dissemination of Russian reflexology as the paradigm of the future of objective psychology: Fernández-España, medical doctor at the Military Health Corps (Bandrés & Llavona, 1996).

### The First Spanish Pavlovian

Between 1914 and 1931, Fernández-España published a series of 21 articles in the journal *Revista de Sanidad Militar* [*Journal of Military Health*], based on the analysis of the contemporary panorama of scientific psychology. In 11 of these articles, objective psychology and reflexology were the preferred topic of study. In his 1914 article “Apuntes de Psicología Afectiva” [“Notes on Affective Psychology”], he addressed the topic of the mental image from the point of

view of reflexology. He proceeded to expound Pavlov’s experiments using the, at that time, common term, “conditional reflex,” by demonstrating the emotional nature implicit in conditional reflexes. He also mentioned the possibility of establishing escape or avoidance movements. Later, he addressed another of the great topics of the period: cortical localizations. He commented on the experiences of Orbeli and Toropov regarding the role of the cerebral cortex in conditional reflexes and added that “although it is premature to say that ‘thought is a reflex,’ one can clearly see the blueprint of the highest functions, which future discoveries will extend to the association of ideas and to verbal-motor reactions of language” (pp. 751-752).

Fernández-España (1915a) again emphasized the light that Pavlov and Bechterev’s reflexology threw on the study of mental phenomena, but this time he presented psychoanalysis and the Wurzburg School as co-drivers of the renovation of psychology based on reflexology. Fernández-España admitted that internal experience is much richer in tone than that revealed by objective research and introspection will be the main path to its study; but it is more likely that verification will come from objective phenomena. If the study of mental phenomena is not pointing in the objective direction, this is due to gaps in the research method. “This has caused an unfortunate and profound gulf between physiologists and psychologists, that is, however, artificial. It is insufficient to prove that, objectively, any neuropsychological act is a reflex ... it is still necessary to explain how this whole motor process is related to the introspection data that we call mental images or thoughts ...” (p. 127). Fernández-España respected Pavlov’s decision to explicitly disregard issues of thought in his empirical research, but he expressed more sympathy for Bechterev’s position, which considered symbolic reactions and voluntary acts as a feasible field for research in reflexology. Fernández-España was always interested in the role of other contemporary research projects within the framework of the objectivist project. He respected the Wurzburg project, provided their data were placed within the perspective of objectivism. Fernández-España never avoided the issue of the supposed limitations of objectivism in the study of the higher functions and he referred to Buhler’s ideas in an attempt to overcome these limitations.

Fernández-España (1915b) again addressed the issue of support for objective psychology from Freud’s investigations. He briefly described the psychoanalytical method in his work and mentioned a case he observed personally of a hysterical woman who was cured by a combination of psychoanalysis and hypnotic therapy. He criticized the sexual interpretation of almost all traumatismas as exaggerated, arguing that the data from psychoanalysis are more enlightening within the objectivist perspective. Fernández-España (1915c) would insist in his thesis that objective psychology could include the study of any kind of higher mental process, and he pointed out that collaboration with

psychoanalysis would allow one to address such obscure processes as creativity. He noted that the experimental method was not sufficient unless it was accompanied by the objectivist focus, particularly, that of Bechterev: "Instead of spirit, one now finds the mechanism of the cerebral reflexes and instead of the notion of the self, the central complex of the latter" (p. 604).

Fernández-España (1916a), after restating his position that psychological phenomena are of a material nature and that the existence of an unconscious psychological life is independent from intellectual life, he briefly addressed the military implications of his reflexological psychology: "One could define man as an exuberant reflex .... Military education and instruction consist mainly of directing these reflexes until they become automatic .... Because of the strength of things, all the Officials are progressively led to practice psychology" (pp. 133-135). His mistrust in the Wurzburg school became apparent in another work produced in 1916 (Fernández-España, 1916b). The works of 1916 ended with an article (Fernández-España, 1916c) devoted to Bergson's psychology, with the pretext of the lectures he offered that year at the Ateneo and at the Residencia de Estudiantes [Students' Boardinghouse] in Madrid. After expounding the chief ideas of Bergsonian psychology, he gave criticism with an objective psychology viewpoint. He called the physiology to which it resorted obsolete, as it overlooked the research of authors like Pavlov and Bechterev, and he again pointed out that there is no reason to separate cerebral dynamism from the highest manifestations of the spirit. Fernández-España rejected Bergson's explanation of thought.

In 1919, Fernández-España devoted a work to the topic of cerebral localizations. In this article, he reviewed the shifts of localizationism from the beginning of the 19<sup>th</sup> century until the contemporary research of authors such as Munk, Nasse, Bechterev, Agajdaniantz, Tlehsig, and Matisse. The research by Pavlov and some of his disciples, such as Toropov, received special mention. It included a long quotation from Pavlov's "Natural Sciences and the Brain" and concluded by reaffirming that the conditional reflex method promised to reveal the functioning of the highest operations of the brain.

In his work on mental images, Fernández-España (1921) carried out a very well documented review of the works of Pavlov's Laboratory, and reflected on some of his theoretical postulates. Fernández-España echoed Kostyleff's criticism of the omission of introspection from the works of St. Petersburg and of his proposal that motor processes are always related to introspective data such as mental images or thoughts. Pavlov refused to use these analogies. Fernández-España, however, thought that after repeatedly obtaining concordant data "one can admit reciprocal explanations to combine in a unique translation one and the same phenomenon, at the same time physical and psychological ..." (p. 260). For him, no matter whether

mental images were interpreted according to Taine, or Duprat, or Bergson, Pavlov's works were the best support for their existence. Fernández-España described the typical Pavlovian experiments and Pavlov's aim to apply the same methods and interpretations of physiology of the elemental functions to higher cerebral phenomena, that is, to determine the laws of the relationship between the variations of the environment and those of the organism. According to Fernández-España, these investigations confirmed, "a determinism of psychological phenomena, as rigorous and evident as that of physical phenomena ... there will come a time when mathematical analysis, with the help of scientific-natural analysis, will express the entire equilibrium in formulas and equations ..." (p. 261). Although he admitted that it was still early to know the physiological mechanism of associations, Fernández-España quoted Bohn's *New Animal Psychology*, in which a chemical substrate of learning phenomena was suggested, and he reviewed the works of Pavlov's school on dogs' analyzers, describing, among other investigations, those of Bielakov, Orbeli, Kacherinova, and Toropov. He also noted that salivary reflexes do not end in any unique localization, because no concrete lesion entirely eliminates them. According to Fernández-España, the conditional reflex is based on a representation of images with affective quality, caused by evocative perceptions; the affective image produces the psychological excitation and is therefore the axis of Pavlov's experiences. He concluded: "Nothing is isolated, either in the psychological self or in the activity of the nervous system" (p. 298).

The last two articles of the series comprised a sort of recapitulation and appraisal of objective psychology. In the first one, Fernández-España (1923) acknowledged that ideation still resisted experimental methods, and, starting with that, he reviewed the panorama of experimental psychology. Fernández-España regretted that 30 years of experimental psychology ran the risk of being reduced to a universe of fragmentary observations, and he expressed his hope that psychoanalysis and experimental psychology could overcome this situation. His work, "Nuevas Orientaciones en la Psicología" ["New Directions in Psychology"] (Fernández-España, 1924) was his last word of warning about the future of objective psychology. He once again warned readers of the danger of fragmenting psychology and the no less unnerving possibility of turning back to pure introspection and from there to metaphysics (as he considered had occurred in Wurzburg). According to him, the only solution would be to assume the objectivist paradigm represented by Pavlov and Bechterev, and, better still, that of the latter, because his theoretical positions allowed a more rewarding use of introspective data.

Despite the realism of Fernández-España's outline and the basis of his concern for the future of experimental psychology, we must remember that experimental psychology was not completely absent from the initial development of Spanish Scientific Psychology. Spanish researchers who

went abroad to complete their training were imbued with the experimental mentality, and some of them, such as Lafora, Viqueira, and Rodrigo Lavín, carried out inestimable works abroad. What many people may not know is that two Spanish investigators, working in Spain, attempted to start their own experimental research in the field of learning. The first one, represented by Luna has already been mentioned above. The second trend, pursued by Planelles, in collaboration with the Institute of Medical Pathology which was directed by Marañón, could be the first experimental investigation of Pavlovian orientation performed in Spain (Bandrés & Llavona, 1997a).

### Juan Planelles: Pavlovian Experimentation

In 1935, *Archivos de Neurobiología* [*Archives of Neurobiology*] published an article by Planelles and his collaborator, Luwisch, in which they reported having obtained hypoglycemic response-conditioning in dogs. Both authors also presented these works at the Institute of Medical Pathology on November 9, 1935. Planelles's group had been investigating the factors that control the metabolism of carbohydrates in dogs. For this purpose, it was essential to perform repeated glycemia determinations to establish the corresponding curves. Planelles wondered whether the fact that the animals were systematically fed after finishing the glycemia curves might establish a conditioned production of insulin and, therefore, an alteration of the glycemia determination performed prior to being fed. In order to verify this, he first checked to see whether the glycemia determinations repeated throughout the morning could provoke alterations by themselves. The results were negative. Once this possibility was discarded, he proceeded to repeat the glycemia curve in dogs that were habituated to the experimental laboratory, but this time, allowing the animals to see the food. A hypoglycemic response reaching 2% was observed, and this rose in successive tests. In a later experiment, he proceeded to study the effect of the same procedure on new dogs that were not used in any experimental procedure. Not only was the former response not observed, but a hyperglycemic reaction reaching 23% was obtained. This result confirmed Planelles's hypothesis that the hypoglycemic response is conditioned: the animals that were habituated to the laboratory procedure anticipated food after the blood extraction session was over, presenting the hypoglycemic response. The new animals reacted to the procedure –cages, blood extractions– with the logical anxiety that justified the hyperglycemic response and the corresponding lack of appetite when presented with food after the experimental session. If this explanation were true, it should be possible to establish the conditioned hypoglycemic response by habituating the new dogs to the procedure and the laboratory personnel. In effect, following the observations, the hyperglycemic response was observed

to disappear progressively over the next four weeks, to be replaced with a conditioned hypoglycemic response. Additional proof of the established conditioning was forthcoming upon observing that, after a lapse of two months "rest," during which the animal lived away from the laboratory, the conditioned response was verified, an expected result, as no extinction procedure had been undertaken. In view of their results, Planelles and Luwisch proposed the revision of Cannon and Carlson's model of hunger regulation, and they concluded in their article: "We therefore believe we have demonstrated the existence of a humoral factor in the origin of the appetite, and that the production of the reflex that conditions this factor is subject to the conditions that regulate conditioned reflexes" (p. 385).

The following year, at the session of the National Academy of Medicine on February 28, three different events coincided: a commemorative address for Pavlov, who had died the day before, given by Rodríguez Pinilla, a complimentary speech by Fernández, and a communication "Un Factor Humoral del Apetito de Producción Condicionada" ["A Conditioned Humoral Factor of Appetite"], which outlined the aforementioned Pavlovian conditioning investigation, presented, this time, by Planelles alone.

### 1936: In Memoriam

The Spanish scientific community reacted quickly to the news of Pavlov's death with profound respect. In addition to the homage paid at the Academy of Medicine, various manifestations of acknowledgement were published in the *Necrological Notes* of several journals (Bandrés & Llavona, 1997b).

Rodríguez Pinilla (1936), in his speech at the Academy of Medicine, observed that Pavlov's fame, in the scientific and literary areas, was more related to his most spectacular and prodigious work (conditioned reflexes) than to his more extensive work and study plans, those relating to psychology, genetics, or energetics: "Conditioned reflexes do not only lead to knowing immediate causes, but can also lead to changing our common belief about the concept of cause, repeating the Hegelian statement (all causes operate backwards and forwards), that is, every cause is, in turn, an effect and no more than a correlation of universal psychophysical phenomena" (p. 150). He added that the Pavlovian studies at that time focused on the domain of heritage (they compared physiology of the brain and higher nervous activities) awakening the interest of those present at the International Congress of Physiology of Leningrad (1935). He observed the peculiarities of the method employed: "Pavlov did not use genetic methods except for solving problems of pure physiology .... And instead of concentrating on morphological heritage, Pavlov looked for more subtle variations of physiological heritage by means of the method of conditional irritants" (p. 150). He concluded

by indicating a horizon full of possibilities: "If these experiments are successful, it would be possible to destroy the obstacle that currently separates hereditary traits from those acquired in individual existence" (p. 151). This would be his disciples' task. In his brief subsequent commentary, Fernández focused on physio-chemical considerations of the role of the peptonizing action of gastric juice within the framework of Pavlov's work, linking his ideas to those of Levené and his goal of studying the transmission of character by means of nucleic acids. He coincided with Professor Pinilla in his appraisal of the research horizons of Pavlov and his collaborators inasmuch as they had transcended the field of morphology, consolidating their work in the merging of chemistry and biology.

On Tuesday, April 21st, in the newspaper *Ahora* [Now], the article "La Lección de Pavlov" ("Parábola del Joven Impetuoso") ["Pavlov's Lesson (Parabola of an Impetuous Young Man)"] was published, and signed by Marañón (1936). The author, who was a member of the, at that time, already dissolved *Agrupación al Servicio de la República* [Group at the Service of the Republic], evoked the memory of the wise "and universal" Russian in the context of the political uncertainties of the Spanish times—the February elections, won by the *Frente Popular* [Popular Front], the social agitation, and the problems of public order—and with his own shifting positions regarding the Republic. Marañón presented Pavlov as an example of the scientist who never stops working, not even when his country is shaken by the events of the revolution. This, he stated, has nothing to do with physiology: "And, just as creation is above history; and just as, for the just man, the eternal is always above the accidental no matter how terrible, he did not interrupt his experiments, with which, despite the revolution, he silently carried on with the history of the eternal Russia" (p. 9). Later, Marañón remembered that, although Pavlov did not share the communist regime, he never spoke out against it, because the regime was the legal representation of the country. He subsequently called to mind Pavlov's last article, written for the Russian youths' journal *The Generation of Victors*. What did Pavlov want for the youth of his country? Tenacity, observation, interpretation, modesty, and passion. This—commented Marañón—is Pavlov's legacy.

*La Cruz Roja* [The Red Cross], a journal published in Madrid and the official voice of the Spanish Central Committee, offered an unsigned note in its April issue that was more doctrinal than biographical (Anónimo, 1936), and was also reproduced in the Section "Tertulia Médica" ["Medical Circle"] of *El Siglo Médico* [The Medical Century]. It spoke of Pavlov's first work, when he was still a student, and remembered that, for over 60 years, he worked on the physiology of digestion. The psychological salivation issue allowed him to go from stomach physiology to cerebral physiology and to generalize the notion of the conditioned reflex. It added that this reflex is completed in man with the mechanism of words and their counterpart, fantasy. At

this point, it observed, Pavlov's thought approaches that of Freud. It subsequently reviewed the Pavlovian analyses of bio-typology and foresaw the future of this science, which "is on the way to modifying the currently observed concepts and practice of medicine, applied physiology, education, professional guidance and selection, and working and penitentiary regimes" (p. 183). The article finished with an allusion to Descartes' bust at Koltouchi, as homage to the precursor of the reflex theory: "In effect, this new, Cartesian-inspired stage of human thought associates the objective with the subjective, combines physiology and psychology, harmoniously solving the oppositions that science and philosophy had erected as dogma, because, until now, they were irreconcilable. This new stage is the immortal work of Pavlov" (ibidem).

Lastly, in its June issue, the monthly illustrated journal, *España Médica* [Medical Spain], of which Eleizegui was the owner-director, chose a novel way to commemorate Pavlov. In a short anonymous note, the scope of the main Pavlovian discovery was acknowledged: the importance of conditioned reflexes in the study of neurophysiology, creating a system of ideas that transcended the fields of biology and medicine and had a powerful influence on philosophical thought. Subsequently, as a sample of the orientation of his works of the last years, a transcript was presented of the speech given by Pavlov (1936) at the Second International Congress of Neurology, held in London in July of 1935. The synthesis of Pavlov's concepts of mental illnesses in which, according to the article, his capacity to systematize and his capacity as an experimenter stood out equally, neither surpassed nor equaled by any other physiologist.

On July 18th, a Civil War began in Spain which would dash the hopes of the community of Spanish psychologists. Congresses, meetings, and courses were cancelled. The XI International Congress of Psychology of Madrid had been prepared but could not be held as planned. Publications disappeared although *Archivos de Neurobiología* [Archives of Neurobiology] would try to resist, accompanying the Republican government in its pilgrimage through the Levant zone.

Various protagonists of our Pavlovian history were committed to their ideas: Planelles, who, since 1933 had belonged to the Communist Party of Spain, was first to be named Chief of Health of the Republican Army, and in 1938, was sent to Paris as secretary of the organization of international aid for the Republic. Mira, a former anarchist and founder of the Partit Socialista Unificat de Catalunya [Unified Socialist Party of Catalonia], took charge of the Psychiatric Services of the Republican Army. Pi Sunyer was a member of the Council of Culture of the Generalitat of Catalonia. Marañón agreed with the Franquist theories and awaited the outcome of the struggle abroad.

On April 1, 1939, victory came to General Franco and with it, the purging. It is therefore not surprising that most of the defeated intellectuals who could escape chose exile.

Through exile, Spain lost a large part of the individuals who inspired and performed scientific psychology. Some of them returned discretely, others never came back. The work of the exiled fertilized science in various countries, such as the case of Pi Sunyer in Mexico, Mira in Argentina and Brazil, or Planelles in the USSR.

### Postwar Pavlov: From the Crypt to the Showcase

“The postwar era represents the error of ‘ideologizing’ and state control over this new science [psychology], its renewed ‘philosophication’, and its restoration to the framework of scholasticism. Later on, there is the error of the severe delay in its configuration as a liberal arts specialization at the university level. Lastly, the error of limiting its professional projection, its ‘handcraft’ insertion in the power game of our society” (Carpintero, 1980, p. 52). Given these circumstances and the European socio-political climate, there was an “information blackout” on Pavlov, reflexology, and objective psychology, in Spain, which lasted practically two decades. However, one cannot equate invisibility with absence, or with forgetting: The “recovery” that took place in the sixties is perhaps more apparent than real, and it was certainly not sudden. In the editorial industry, we find some explanations: The first one takes us to the backroom of bookseller “friends,” where, in the mid fifties, one could find topic-related works, those edited in Latin America, more accessible (Colodrón, 2002). The second explanation leads to the consideration of the prologues written in Spain for treatises on or by Pavlov himself, which were published in our country. We will follow this pathway where significant stages can be observed in the information provided, as well as in the assumption of the reflexology viewpoint by the authors of the prologues.

Muñoz Alonso (1963) was in charge of writing the “Prologue” to the Spanish edition of the biography *Ivan Pavlov* by Cuny. He framed his considerations within a panorama of the history of science and the relationship of science with philosophy and technique, with its principles and its applications. Muñoz Alonso indicated two great moments in the origin of psychology as a science: the first, when a method characterized by the application of reason, observation, experimentation, and measurement of phenomena was accepted; the second, when a revolution of principles took place, and the body/soul dualism was abandoned in favor of a new synthesis. As a result of which from then on, psychology became physiological psychology. Pavlov and his work represent a fundamental landmark in this process of overcoming dualism and his contribution is still priceless, even though many of his theories have been revised. However, “his philosophy is dialectic materialism and, therefore, his theory has become the official doctrine of Soviet Russia” (p. 16), even though the conditioned reflex constitutes, to a great extent, the basis of Stalin’s propaganda.

His contribution “is even priceless” (p. 17) to those who, like the author of the prologue, did not share his viewpoint and thought that his remarks were not definitive.

Monserrat-Esteve (1967), in the “Prologue” to *Reflejos Condicionados e Inhibiciones* [*Conditioned Reflexes and Inhibitions*], a compilation of Pavlov’s works selected by Le Ny, pointed out the importance of the orientating commentary in the edition of the classics, which places the author and his work within its proper context, all the more so in a case like Pavlov’s, where the biases of his followers and detractors have made it difficult for the uninitiated to adopt an objective point of view of his work. Consequently, this “Prologue” provided some fundamental data of Pavlov’s scientific biography and the projection of his work. It began by remembering the successes of his beginnings as an investigator—of the nervous regulation of circulation and of the digestive secretions—in which Monserrat-Esteve observed that Pavlov had already been studying animals, in their entirety, in their process of a normal life, starting with the physiological-pathological-therapeutic unity. He subsequently considered the second and definitive stage in Pavlov’s scientific life, that of the conditioned reflexes. Monserrat-Esteve mentioned the classics as antecedents of the concept of the reflex—Descartes and Montpellier—and added a reference to the literary intuitions of Lope de Vega and Cervantes.

Monserrat-Esteve indicated the more theoretical than experimental contributions of Pavlov’s nearest precursors, Sechenov and Prochaska. The transition between one stage and the next culminated in the Madrid Lecture, “the fundamental landmark of Pavlov’s work” (p. 11). In this lecture, this author outlined a work program to which Pavlov and his collaborators devoted the rest of their lives, following a line that reached its zenith in 1935, at the XV International Congress of Physiology, where Pavlov was proclaimed *princeps physiologorum mundi*. Among the early repercussions of Pavlov’s works is the work by Turró, *Els Orígens del Coneixement: la Fam* [*The Origins of Knowledge: Hunger*] (1912). Certain events of political life, for example, the triumph of the Russian revolution, which would contribute to the continuity of Pavlov’s works, received special mention: The new regime’s official aid culminated in 1921 with Lenin’s so-called Pavlovian decree, which would make the biological station of Koltuchi possible. Pavlov’s two fundamental works, “Twenty Years of Experience” (1922) and “Lessons on the Function of the Large Cerebral Hemispheres” (1927), were also mentioned. With regard to the recollection of the “Pavlovian Wednesdays,” that began to be held in the Spring of 1929 and were kept up until Pavlov’s death—there are complete notes from the end of 1929 which were edited in 1949 by the Academy of Sciences of the USSR, and extracted notes in Pavlov’s *Works*, compiled by Kochtoiantz, which were published in Moscow in 1954. Monserrat-Esteve, following Kochtoiantz, mentioned Pavlov’s discussions with Lashley, Sherrington, Janet, and Claparède, among others, as well as those he had with the representatives of Gestalt psychology, Ehrenfels, Köhler, and Koffka, which are analyzed



in more detail, because of their consequences on the evolution of Pavlov's thought. Reflexology became more "molar," and the definition of the reflex arc, by becoming more complex, could explain the organism's equilibrium with the external environment.

How could Pavlov's thought be appraised at the time this prologue was written? Monserrat-Esteve quoted Rubinstein on the subject: "The theory of the reflexes is not the same one that Sechenov and Pavlov formulated, but instead its very advanced generalization," herself adding, "the essence of reflexology endures and is increasingly more important" (p.18). Monserrat-Esteve subsequently traced a general panorama: Some Pavlovian affirmations seem to be confirmed, such as, for example, and judging by the results of conditioning experiments with flatworms, the transition of the conditioned reflex –transmitted by heritage– to unconditioned reflex. He added that, all over the world, groups of researchers with foundations in reflexology were to be found. Among them, the Pasteur Institute of Paris, with Metalnikof and Chorin's immunological studies; the Eysenck school in England; Liddell's work group in the United States, and in both Americas, various interpretations and applications of hypnosis. In the USSR, both medicine and psychiatry were based on Pavlov's theory. Psychotherapy, however, in the opinion of Monserrat-Esteve, following Kostyleff, comes from Bechterev rather than Pavlov. Among the most famous Pavlovian psychotherapies were those formed by the creators of the psycho-prophylactic method of painless birth, Platonov, Velvovsky, Chagam, and Ploticher, as well as those of Ivanov-Smolenski, Birman, Krasnogorski, and Davidenkov, with a common note of approach and search for parallelism between Pavlov's and Freud's concepts, starting with Gavrilov. The "Prologue" ended with some words dedicated to the future version of reflexology, called cybernetics, of which there was proof of its introduction into the analysis of cerebral activity in the works presented at the International Congress of Psychology held in Moscow in 1966. This union, given the similarities of their objectives, could extend the horizons of reflexology: "Cybernetics have not only completed Pavlov's reflex arc, closing it with *feed-back* (generalization of Von Weizsäcker's *Gestaltkreis*), but they have also introduced the concept of pattern ... by means of which a bridge between Pavlov's determinist conceptions and the teleological conceptions of biologists such as Von Uexküll are established" (p. 21).

That same year, a second, more specialized, compilation of Pavlov's works called *Psicopatología y Psiquiatría* [*Psychopathology and Psychiatry*] was published. It had been selected by Popov and Rokhline, and included a "Prologue" by Professor Rof Carballo, founder of the Institute of Psychosomatic Studies. Rof Carballo (1967a) began with praise for the editor's contribution to the task of presenting the choice texts of medicine in Spanish during the second decade of the century. Specifically, readers are reminded that Morata was interested in publishing this work in his own editorial, but the project came to an untimely end with his

sudden death. The historical importance of the selected texts was now even greater because of the growing psychosomatic orientation of medicine. Despite the brief time which had elapsed, Pavlov could be considered a classic who assembled in his work clarity, originality, rigor, and beauty: "a classic who is still in force today and whose validity is constantly renewed" (p. 1). In effect, the investigation of the conditioned reflexes, anticipated in Descartes and continued by Pavlov's disciples, received new enthusiasm from the analysis of the electroencephalographic registers and from the advent of the reticular activation and inhibition systems in the neurophysiology of the nervous system, issues that Rof Carballo himself wrote about in his book *Cerebro interno y mundo emocional* [*Internal brain and emotional world*] (Rof Carballo, 1952). At that time, various groups worked in parallel: for example, Malméjac's school in France, and in the United States, the schools of Gantt and Liddell, who, in May of 1955, founded the Pavlovian Society. By then, literature of Pavlovian orientation had increased considerably.

After a brief bibliographic review that concluded with reference to orientative texts by Gavrilov (1953) and Sokolov (1963), Rof Carballo examined some contributions that warranted more attention. One example was the recompilation by Fischgold and Gastaut, *Conditionnement et Réactivité en Electroencephalographie* (1957) [*Conditioning and Reactivity in Electroencephalography*], of which Rof Carballo noted the advance of knowledge about electrophysiological processes concomitant to reflex conditioning, which did not invalidate but did point out some subtleties in Pavlov's thought. At the root of all conditioned reflexes, he added, is the "orientation reflex," the first response of attention to the variations of the environment and, in the end, the base of scientific activity. This constitutes an "independent functional system" (Sokolov, 1963) whose activation produces biochemical modifications in the cells of neuroglia, something which had been studied since the times of Ramón y Cajal by Achúcarro and Río-Hortega. Rof Carballo subsequently considered, following Anokhin, the integration of the higher levels of the central nervous system, or *afferent synthesis*, as well as the complexity and importance of the *afferent flow*. He also spoke of the negative results of the *de-afferentation*, more specifically the social one, which Rof Carballo called disorders of the "constitutive warp" (Ajurriaguerra, 1965; Rof Carballo, 1961, 1967b).

Lastly, he lingered over the results presented by Liddell in his last works and stated, "Liddell, after 35 years dedicated only to these experiences, suddenly discovers that *all the conditioned reflexes, both positive and negative, are actually prejudices* and, therefore, *neurotic traits*," adding, "the same as the *psychic traumas* that Freud described, around the same time as Pavlov described his conditioned reflexes, these remain *as scars* one's whole life long within the nervous structures" (pp. 7-8). Rof Carballo emphasized a new conclusion to Liddell's last experiences in the conditioning of newborn goats. He also felt the need to extend the concept

of Pavlov's conditioned reflex and to admit that the base, on which everything that follows depends, is on the *primigenial conditioning* that occurs between a mother and her young. This led him to observe that investigation of conditioned reflexes ends by discovering what he called the *warp*. He described the warp as a phenomenon that, in neurophysiological language, "would be expressed assuming that, in order for the development of the dense nervous nets and for the organization of neural fields to occur, under the supervision of the neuroglia cells—development without which a newborn animal *does not acquire biological stability*—, this *primary conditioning*, determined by the presence of the mother and her caresses, is necessary" (p. 9). With the study of this *primigenial, programatory* or *constituent* reflex conditioning, new horizons opened, where perhaps, by extending and revising the repertory of classic concepts, the pathways of neurophysiological and psychoanalytical research would someday converge. The road would be long and, one of the first steps had to be the expansion of the experimental field, going from the "isolated animal" to the "hierarchical group" of animals. Rodríguez Delgado had already done this, according to Rof Carballo, going from the dog, an animal genetically conditioned to human tutelage, to other kinds of animals, such as the monkey, whose relationships with the group is easier to observe.

Colodrón (1968) is the author of the "Prologue," selection, lexicon, and critical notes in the compilation of Pavlov's works, *Fisiología y Psicología* [*Physiology and Psychology*], selected with the aim of presenting the most substantial and up-to-date work of Pavlov. The Madrid Lecture was referred to in this section. After acknowledging Pavlov's fundamental contribution, that is, to make available to experimental knowledge "the interdependence between life conditions and animal and human behavior," as well as "the bit of reality that raises man over all the beings and processes that preceded him" (p.7), Colodrón remembered the reproaches that Pavlov had received. He went on to focus on clarifying six assumptions, that at that time, were still being presented as basic categories of Pavlovian thought, and from which a false interpretation of his thought followed. According to this interpretation, the aim of Pavlovism was: a) to transpose the findings discovered in animals to man; b) to explain consciousness physiologically; c) to reduce mental processes to a univocal stimulus-response relation; d) to turn man into a passive entity, subject to the shifts in environment; e) to deny subjectivity; and f) to offer a de-humanized image of man. Colodrón replied to those misinterpretations with a variety of long quotes from Pavlov and references.

### One Century of Reflexology in Spain

The editorial Fontanella, in Barcelona, entrusted Colodrón with the presentation of *Actividad Nerviosa Superior* [*Higher*

*Nervous Activity*], a translation of the *Selected Works* that were published in Moscow by the Institute of Foreign Languages in 1955. Colodrón (1973) employed the epistolary genre to write "A Modo de Prólogo" ["As a Prologue"], some short notes about the reception of Pavlov's legacy. Pavlov's thought fertilized all fields of knowledge and, in Spain, he also became an editorial success. But what is behind that success? "Time has shown that you were right and you might think that this is why they argue about you here. And why they follow you. However, they do not follow you, they argue about you. But not because they know everything that followed you, because of you. Here, they still think about whether your thought can be developed in the future. Here, the future is way behind the times" (p. 7). This is an example of Colodrón's bitter tone when mentioning two factors that had a negative influence on the assimilation of Pavlovian thought in our country: an internal one, the misinformation and prejudices, which still exist, and that he mentioned in his "Prologue" to *Physiology and Psychology*; and another, an external one, being the cultural climate generated around 1968. "People consume grass, acid, speed, and noise, looking for lost paradises. And those who hope to escape from Eros and Thanatos take refuge in Yin-Yang" (p. 8). It was a bad time for conditioning.

In this evaluation, one should take into account the viewpoint and trajectory of Colodrón. In his own words, Colodrón's evaluation has something of "memory lived in times of silence," and it also gathers the echoes of the author's debates from the courses he taught between 1966 and 1969 in Madrid, outside of official university teaching, in two centers promoted by sociologist Vidal Beneyto. The first center was the School of Social Sciences. When it was closed by the government in 1968, a second one was opened: the Critical School of Social Sciences, that lasted until February of 1970. In this context, Pavlov—or rather, what Pavlov was supposed to have said—was confronted with the Marx of the *Manuscripts*, psychoanalysis, anti-psychiatry, and the oriental philosophies (Colodrón, 2002). In a polyphonic approach, other voices marked a counterpoint to Colodrón's voice: for example, the prologues by Monserrat-Esteve and by Rof Carballo revealed different personal implications and suggested complimentary lines for a global appraisal that is still to be made. We must also consider that in 1968, the first legal steps were taken to implement a Psychology Licentiate in the Spanish University by incorporating a special program within the Philosophy Section of the School of Philosophy and Arts at the University of Madrid. This process led to the approval of a specific syllabus in 1973 that culminated in 1979 with the acknowledgement of independent schools and the creation of the Official College of Psychologists.

Between the Restoration in January of 1875 and the new instatement of the Monarchy in November of 1975, after the end of Franco's Dictatorship, a century of reflexology had gone by in Spain. Two fundamental

pathways of access to Pavlovian theory began with Simarro, Ramón y Cajal, and Turró, who constitute the source of the two great schools, in Madrid and Barcelona, of Spanish Neurophysiology and Psychology. But they were not the only ones. Among those authors who were influenced by Pavlov were those such as Novoa Santos, Marañón, and even Planelles, who belongs to a different genre, that of specialists in medical pathology. However, these trends unite in common interests and undertakings such as the founding and maintenance of the *Archivos de Neurobiología* [*Archives of Neurobiology*]. Military Health was also, at that time, another way to access Pavlov's theory that possessed its own vehicles of expression. Among the authors to come from this corps, as we have seen in depth, is Fernández-España. Thus, the Spanish scientific community reacted to the news of Pavlov's death, fully aware of the research horizons that had been opened up by Pavlov and his collaborators, although only a few of them, like Planelles, insisted on pursuing his investigations. Marañón, speaking of Pavlov's ability as an investigator, spoke of a man who overcame the adversities of his socio-political situation. Marañón tried to make an example of Pavlov and apply this example to the situation in Spain. When talking about Pavlov, Marañón was talking about us and for us. "Creation"—he said—"is above History." The Civil War put an end to creation and brought about exile; the Dictatorship was a time of silence that went on until, at the beginning of the '60s, there was discord between society and politics in Spain. In the meantime, psychosomatic medicine was the hidden conduit for research that was in line with Pavlovian thought. It would also become the roots of the works by Ramón y Cajal, Achúcarro and del Río-Hortega. After two decades, Pavlov went from the crypt to the showcase, from the back-room of the bookshop to editorial success. The prologues written by Spanish authors to Pavlov's works not only fulfilled the role of presenting the work to be read, but also the roles of remembering part of history and of acting as prelude to a labor still to be performed, shortly afterward, at the Psychology Schools throughout Spanish Universities.

Reflexology started in Spain within the context of the consolidation of positivist mentality and increasing secularization of thought, wherein the diffusion of the ecological paradigm and acceptance of evolutionism took place. The acceptance of Pavlovian theory is not an isolated fact. Pavlov and his group of collaborators came into our country preceded by Sechenov, accompanied by Bechterev, and followed by Watson. Moreover, although he was not a part of the group, Freud was consistently considered as a complement to their work. This complement affected the impact Pavlov had on Spanish psychology and psychotherapy, as did the political circumstances of the Soviet Union, the Franquist Dictatorship, the Cold War, the French May of 1968, and the Revolution of the Flowers.

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